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Applicant and inventor:

Dr. Hans Lautenschlager, 5024 Pulheim

**Skin treatment agents having high lipid contents and using a system containing bilayers, salts of organic acids, alcohol and a stabiliser**

Abstract

Skin treatment agents, characterised in that they contain a bilayer source of organic acids, alcohol, a stabiliser and lipids in high concentrations.

Description

The subject matter of the present invention are skin treatment agents having high lipid contents and using a system containing bilayers, salts of organic acids, a stabiliser and alcohol.

Skin treatment agents are used in the fields of cosmetics and dermatology to restore properties of the skin changed by outside influences or to improve the skin status in general. In dermatology, the main focus is the treatment of skin diseases. For this purpose, fats, oils, emulsions, suspensions and solutions of different chemical compositions are applied to the skin. Accordingly, such formulations may contain cosmetic and/or dermatological active ingredients. One of the most recent developments in this field are liposomes.

Liposomes are vesicles of many different structures. Depending on the method of preparation, we distinguish between unilamellar, oligolamellar, multilamellar or fused bodies having a membrane structure and a diameter of about 15 to 3,500 nm. A survey is given in H.P. Fiedler, "Lexikon der Hilfsstoffe für Pharmazie, Kosmetik und angrenzende Gebiete" (Encyclopaedia of adjuvants for pharmacy, cosmetics and related fields), Publisher Edition Cantor, Aulendorf 1989, p. 744 - 746.

As generally understood, liposomes are composed of natural, semisynthetic and synthetic phospholipids, the main component usually being phosphatidyl choline.

Secondary components, for example, are phosphatidyl ethanol amine, phosphatidyl inositol and phosphatidic acid. Depending on their fatty acid occupancy, we distinguish between unsaturated (natural), partially hydrogenated and hydrogenated phospholipids.

Similar to biological cells, liposomes are capable of storing water-soluble substances in the vesicular interior regions and amphiphilic and lipophilic substances in the membranes (loaded liposomes). Examples of membrane loadings are vitamin E, retinoids, steroids, lipophilic and amphiphilic active ingredients as well as oils of vegetable and animal origin.

Lipophilic active ingredients and oils of vegetable and animal origin are of special importance in the field of cosmetics for optimal skin care, particularly for the treatment of dry skin. Distribution and penetration into the skin is also of decisive importance in the case of highly unsaturated oils which, for example, are used for the treatment of atopic dermatitis [H.P. Nissen, W. Wehrmann, U. Kroll and H.W. Kreysel, *Fat. Sci. Technol.* 90 (7), 268 - 271 (1988)]. Therefore, liposomes are the ideal carrier system as far as distribution and penetration into the skin is concerned.

It is an interesting aspect that the basic structure of liposomes, namely the lipid double layer(s), also called bilayer(s), is contained in the intact stratum corneum (B.W. Barry, "The Transdermal Route for the Delivery of Peptides and Proteins", Plenum Press, New York 1986). The stratum corneum is the outermost and therefore visible part of the epidermis. This portion of the skin, which is no longer "alive", is permeated by lipid bilayers which are formed by keratinosomes as "intercellular cement". The chemical composition of these bilayers is highly complex, the main components being fatty acids, ceramides and cholesterol as well as derivatives thereof.

From a physical point of view, these lipid bilayers have the same structural elements as the membranes of the liposomes, but they lack the "spherical shape".

The lipid bilayers of the stratum corneum have an important barrier function. Therefore, their integrity is a prerequisite for an orderly water balance of the skin. As mentioned above, this barrier function is often disrupted. This may be due to different reasons, for example the frequent external application of surfactants

(soap, cleansing lotions, shampoo, etc.). The method of restoring the disrupted barrier function without waiting for the natural process of renewal is to apply fatty cream having a smaller or larger content of moisturising factors to the skin after washing.

The liposome technology now provides an interesting alternative. As a bilayer source, the lipid bilayers absorbed by the stratum corneum in the form of liposomes restore the natural barrier. Support by the lipid bilayers does not have an occlusive effect on the skin surface as found, for example, in pure hydrocarbons such as paraffin oil, since the barrier layers are not completely sealed vis-à-vis moisture. This is desirable, since an occlusive effect will cause a change in skin metabolism [M. Rieger, *Cosmetics & Toiletries* 104 (12) 41 - 51, (1989)].

Despite the above-mentioned ideal characteristics, however, the liposomes known so far have essential disadvantages.

Owing to the high-purity starting materials generally used - usually phosphatidylcholines in high concentration - and the complicated method of preparation, liposomes of a classical composition are far more expensive than customary emulsions with less favourable characteristics.

Liposomes of the classical composition have but little storage capacity for lipophilic substances. Even though liposomes consisting of unsaturated phospholipids are capable of absorbing approx. 10 to 30 % of their weight in triglycerides, this means a final concentration of 1 to 3 % of triglyceride in the formulation even for a high-concentration liposome dispersion containing 10 % by wt. of liposome base material (in the dry substance). In comparable O-W emulsions, on the other hand, 10 to 20 % by wt. of lipophilic components are customary.

Attempts have been made to solve this problem by using emulsifiers, because these are also able to disperse lipids. However, emulsifiers have several disadvantages, especially when used in skin treatment agents intended to penetrate far into the skin. For example, a person skilled in the art is well aware that they may have an irritating effect on the skin depending on one of its material constants, namely the critical concentration of colloidal particles [U. Zeidler,

Ärztliche Kosmetologie 19 (3), 208 - 219 (1989)]. The higher the critical concentration of colloidal particles, the higher the portion of emulsifier molecules without micellar bonding and thus the potential of irritation. Non-ionic emulsifiers are known to have the greatest capability of penetrating into the skin in comparison with other types of emulsifiers [W. Kästner, "Seifen, Öle, Fette, Wachse 116 (1), 3 - 9 (1990)]. Also, it must be taken into account that systems having liposomal structures show incompatibility with emulsifiers, especially if these are used in higher concentrations [H. Hauser, *Chimia* 39, 252 (1985)].

Therefore, it may be defined as an objective for an optimal skin treatment agent that the formulation should contain as much of a bilayer source and as little emulsifier as possible, the latter having a minimal irritation potential and containing a large quantity of lipid in dispersed form.

In addition, it would be ideal if the emulsifier were converted into physiological or physiologically related substances after application so that it cannot be removed when the skin is subsequently washed with water, which would withdraw lipids from the skin as a result of the remaining emulsifying action.

In formulations having higher dosages of a bilayer source which usually consists of phosphatidyl choline having a high content of chemically bonded linoleic acid, we are faced with the problem of making these formulations stable against auto-oxidation. While contents of 0.1 to 2 % by wt. of phosphatidyl choline may still be stabilised easily with vitamin C or E or derivatives thereof or other customary antioxidants, this becomes very difficult at contents of 2 to 10 wt.-%. As a result, stability is shortened and the formulations may become rancid, especially after application to the skin which is evident even to laymen by the unpleasant odour.

Surprisingly, it has now been found that the above mentioned problems may be solved in a most elegant manner by forming a mixture of a liposome base material (1) which constitutes the bilayer source in the finished skin treatment agents of the invention, a lipid (2) or a lipid mixture, an organic acid and an alcohol (4) and stirring into this phase an aqueous water phase containing alkali hydroxide, said organic acids being converted into their alkali salts (3) which then act as anionic emulsifiers. For the sake of simplicity, the salts of the organic acid (3) may be added directly. The stabiliser (5) and, optionally, other substances customary in the fields of cosmetics and dermatology such as active ingredients, preservatives,

antioxidants, consistency regulators, dyes and perfumes are then incorporated into the formulations thus prepared.

Accordingly, the main components of the skin treatment agents of the invention are the liposome base material as the bilayer source (1), lipid (2), salts of organic acids (3), alcohol (4), stabiliser (5) and the usual additives.

Bilayer source (1): The bilayer source as a main component of the skin treatment agents of the invention consists of a liposome base material. As mentioned above, the liposome base material most frequently used is phosphatidyl choline. Products of this type are commercially available under different trade names and are prepared by firms processing lecithin. Advantageously, phosphatidyl cholines obtained from vegetable sources, usually soy beans, or from animal sources, usually chicken eggs, are used. These may also be present in hydrogenated form. Another liposome base material used are sphingolipids, the main components of which are ceramides, cerebrosides and sphingomyelins. These substances are usually of an animal origin and are recovered, for example, from the brains of cows. In many cases, it is useful to use phosphatidyl choline and sphingolipids in certain ratios in order to obtain the desired properties of the skin treatment agents of the invention.

It is the function of the bilayer source to restore damaged lipid bilayers of the stratum corneum and to transport lipids into these layers which are usually present in an intact stratum corneum, but also to increase the content of natural lipids by additional lipids both from a quantitative and qualitative point of view. On the one hand, building up the lipid bilayers results in an improvement of skin characteristics such as skin moisture, softness of the skin and decrease of the transepidermal water loss. On the other hand, the depot effect of the stratum corneum for dermatologically active substances is much improved. This is particularly important for the cosmetic and dermatological active ingredients contained in the skin treatment agents of the invention.

Depending on the composition of the skin treatment agents of the invention, the bilayer source may be present in the form of many different vesicles, all of which have in common that they possess liposomal structural elements (bilayers):

- (a) Classical unilamellar, oligolamellar, multilamellar liposomes, e.g. in cases of high contents of the bilayer (1) and lower lipid contents (2).
- (b) So-called propeller liposomes at comparable contents of the bilayer source (1) and lipid (2). Propeller liposomes are characterised in that they consist of aggregates of oil droplets and classical liposomes.
- (c) Liposomes of the chylomicron type in case of high contents of the lipid (2) and lower contents of the bilayer source (1). Liposomes of the chylomicron type are characterised by having a more or less highly developed oily internal phase formed by the lipid (2), while the lamellar liposomal structure largely formed by the bilayer source (1) is maintained. In extreme cases, the internal phase may be filled completely with amphiphilic and lipophilic components. These preparations are of particular interest, because they are inexpensive due to the fact that very little phosphatidyl choline (less than 5 % by wt.) is used and may advantageously be combined with cosmetically and dermatologically effective protein hydrolysate condensates as the organic acid and active ingredient component. For example, palmitoyl collagen hydrolysate, capryloyl collagen hydrolysate, undecenoyl collagen hydrolysate and acylated hydrolysates of casein, keratin and hydroxy proline may be used as active ingredient components. It goes without saying that defined pure substances such as the N-palmitoyl derivatives of glutamic acid, arginine, aspartic acid, lysine, serine and isoleucine may also be used.

Therefore, the choice which type of liposomal vesicles should be used is largely determined by the intended use of the skin treatment agents of the invention, because this is what the composition to be used depends on.

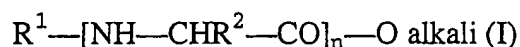
Depending on the composition of the phospholipid formulations of the invention, mixtures of classical liposomes, propeller liposomes and liposomes of the chylomicron type may result.

Lipid (2): The lipid as a main component of the skin treatment agents of the invention may consist of native oil, (partially) synthetic oil, carboxylic acid esters, liquid wax esters, oily hydrocarbons or mixtures thereof. Native oils are understood to mean natural oils of vegetable or animal origin. Vegetable oils, for

example, are sunflower oil, thistle oil, avocado oil, almond oil, soy oil, castor oil, peanut oil, wheat germ oil, carrot oil, apricot kernel oil, borage oil, evening primrose oil, hazelnut oil, palm kernel oil, sesame seed oil, linseed oil, macadamia nut oil, maize germ oil, turnip oil, poppy seed oil, peach kernel oil, olive oil, walnut oil. Animal oils are, for example, mink fat and fish oil. (Partially) Synthetic oils mainly are triglycerides the acid components of which consist of defined or mixtures of medium- or long-chain fatty acids, such as capronic acid, capric acid, stearic acid, isostearic acid, palmitic acid, oleic acid, linoleic acid, ricinoleic acid. The synthetic oils also include the silicone oils. Carboxylic acid esters are, for example, isopropyl palmitate, isopropyl myristate, isopropyl stearate, oleyl oleate, myristyl lactate, cetyl lactate, 2-ethylhexyl palmitate, isooctyl stearate, hexyl laurate, dibutyl adipate, 2-octyl decanol, and isopropyl linoleate. Liquid waxy esters are contained in jojoba oil, for example. Solid waxy esters may also be used if they can be dissolved in one of the above-mentioned liquid oils. Examples of oily hydrocarbons are paraffin oil or heptamethyl nonane.

The function of the lipid component has been described above in connection with the renewal and improvement of the stratum corneum lipid bilayers. Another important function of the lipid is its solubilising effect for cosmetic and dermatological ingredients.

Salts of organic acids (3): The salts of organic acids as a main component of the skin treatment agents of the invention are alkali salts of carboxylic acids which are either used as such or are formed from the corresponding carboxylic acids with the aid of alkali hydroxides during the production process of the skin treatment agents. After application of the skin treatment agents of the invention to the skin, the acids are gradually released from the carboxylic acid salts as a result of the natural decrease of the skin pH. As a result, the desired emulsifying properties of the carboxylic acids initially present in salt form are lost. Therefore, weak physiological carboxylic acids such as palmitic acid, stearic acid or mixtures of these acids may be used. They acids are part of the composition of the skin. Another group of carboxylic acids are the acylated hydrolysates of collagen, also called collagen hydrolysate condensates, of the general formula:



wherein

R<sup>1</sup> represents a saturated or unsaturated acyl group having 1 to 22 carbon atoms, R<sup>2</sup> represents side chains of the amino acids of the collagen, and n is an integer from 1 to 10.

Collagen primarily contains the amino acids glycine, proline and hydroxyproline as well as portions of glutamic acid, arginine, aspartic acid, lysine, leucine, serine and isoleucine.

The salts of the collagen hydrolysate condensates, which are known under the designation Lipacide and Lamepone (H.P. Fielder, Lexikon der Hilfsstoffe für Pharmazie, Kosmetik und angrenzende Gebiete, Editio Cantor, Aulendorf, 1998, p. 713, 741), for example, are slowly converted back to their basic organic acids after application of the skin treatment agents of the invention to the skin. In this process, they lose their emulsifying and emulsion-stabilising characteristics. Since they are closely related to components of the skin, they are also excellently suited for cosmetic and dermatological skin treatment agents.

Analogously, the salts of acylated hydrolysates of elastin, casein, keratin or O-acyl derivatives of hydroxyproline may be used to advantage.

The alkali hydroxides used for preparing the skin care agent of the invention are mainly sodium hydroxide and potassium hydroxide. These components are not necessary if the corresponding alkali salts of the organic acids are used directly. Bases forming physiologically acceptable salts may be used analogously. It is important that the organic acids are present in the form of salts having emulsifying and emulsion-stabilising properties after preparation of the skin treatment agents.

Alcohol (4): The alcohol forming a main component of the skin treatment agents of the invention preferably is ethanol at a content of 90 to 100 %. However, other straight-chain or branched-chain alcohols or polyalcohols such as propanol, isopropanol, 1,2-propylene glycol, 1,3-butylene glycol or glycerine may also be used. Adding the alcohol has the function of obtaining a homogenous solution when the ingredients of the formulation are mixed. In addition, alcohol is known to have a special skin-care effect, especially when 1,2-propylene glycol, 1,3-butylene glycol or glycerine are used. Another important function is the biostatic or biocidal effect of ethanol on micro-organisms which are responsible for the

deterioration of cosmetic and dermatological products. That way, typical preservatives may either be left out altogether or reduced in most of the skin treatment agents of the invention. In this respect, 1,2-propylene glycol and 1,3-butylene glycol also have a beneficial effect (K.H. Wallhäuser, Praxis der Sterilisation, Georg Thieme Verlag Stuttgart, 1988).

Stabiliser (5): The stabiliser as a main component of the skin treatment agents of the invention is usually urea. In combination with the usual antioxidants, it has the function of improving the oxidation resistance of the skin treatment agents of the invention decisively. On the other hand, urea is a natural skin-care agent known to persons skilled in the art which is a component of the skin and, among other things, has a beneficial influence on the water balance of the skin. Other typical stabilisers are monosaccharides such as glucose, fructose, mannose, galactose, sorbitol, inositol and other saccharides. It goes without saying that mixtures of the above-mentioned stabilisers may be used if they are advantageous.

Other substances customarily used in the skin treatment agents of the invention are cosmetically active ingredients or dermatologically active ingredients:

Cosmetic active ingredients of the skin treatment agents of the invention are fats, vitamins (especially the A, B-complex, C, E and the usual derivatives thereof, such as vitamin A palmitate, vitamin E acetate), provitamins such as  $\beta$ -carotene, essential oils, self-tanning substances such as tyrosine; UV absorbers such as urocanic acid and esters thereof, skin protection substances such as ricinoleic acid derivatives, phytosterols, cholesterol, cholesteryl sulfate, squalene, palmitic acid, stearic acid, isostearic acid. Active ingredients such as panthenol, bisabolol, plant extracts, animal extracts, linoleic acid esters, alpha- and gamma-linolenic acid esters, collagen and elastin hydrolysates and condensates thereof with fatty acids, glutathione, ceramide and sphingolipids. In many cases, the above-mentioned lipids (2) such as vegetable oil and animal fats and waxy esters also have a cosmetic effect owing to their composition.

Dermatological active ingredients of the skin treatment agents of the invention are retinol and esters thereof, vitamin A acid and esters thereof (tretinoin), isotretinoin, retinoids in general, antimycotics, antiseptics such as chlorohexidine, antipruritics, salicylic acid, salicylic acid methyl esters; anti-inflammatory substances, substances stimulating the blood flow such as nicotinic acid benzyl

ester; camphor, corticoids such as hydrocortisone, betamethason, triamcinolene, dexamethason, prednisolon; heparin, cytostatics, antihistamines, anti-allergic agents, antibiotics such as tetracycline, erythromycin, gentamycin, neomycin; anti-parasite agents, preparations for varicose veins, wound treatment agents, astringents, anti-acne agents, anti-psoriasis agents, anti-seborrhoeic agents, anti-sebostatics, keratolytics, agents for treating scars, allantoin, clotrimazol, guajazuline, hexyl resorcin, isoprenalin, fumaric acid, fumaric acid ethyl ester, fumaric acid diethyl ester, dithranol, ichthyol, thymol, oil of rosemary, panthenol, pantothenic acid, extract of camomile, extract of hamamelis, sage oil, eucalyptus oil, spruce needle oil, oil of juniper, valerian oil, valerian extract, extract of oak bark, extract of wheat bran, pine needle oil, borneol, menthol, yarrow blossom oil, limes, extract of seeds, flowers and stalks of various grasses and plants extracted from hay, whey powder, hop extract, lavender oil, tannin, aesculin, aescin, salicyl amide, dwarf pine needle oil, nicotinic acid methyl ester, nicotinic acid ethyl ester, salicylic acid nicotinate, salicylic acid glycol ester, estradiol, dichlorophene, undecylenic acid, colecalciferol, placenta extract, thymus extract, benzalkonium chloride, griseofulvin, nystatin, amphotericin B, clotrimazol, miconazol, econazol, tioconazol, ketoconazol, isoconazol, caffeine, ibuprofen, indometacin, etofenamate, diclophenac, flufenaminic acid, silibinin, silymarin, linoleic acid,  $\alpha$ -linolenic acid,  $\gamma$ -linolenic acid, dihomogamma-linolenic acid, eicosanpentanoic acid, monoxidil, superoxide dismutase.

Examples of other substances customarily used for the skin treatment agents of the invention are fragrances, perfume oil, antioxidants such as ascorbic acid, ascorbic acid palmitate, butylhydroxy toluene, butylhydroxy anisole, propyl gallate, vitamin E, vitamin E acetate, vitamin E palmitate, antioxidant synergists such as EDTA, 1-hydroxyethane-1,1-diphosphonic acid, citric acid, fumaric acid, ureic acid, viscosity and consistency regulators such as polyacrylates, xanthan gum, carrageenans, alginates, bentonite etc.; preservatives such as phenoxy ethanol, p-hydroxy benzoic acid ester, benzoic acid, benzyl alcohol, isothiazolines, imidazolyl urea, diazolidinyl urea and such like, colouring agents such as titania, zinc oxide etc. and mixtures thereof.

The contents of the main components of the skin treatment agents of the invention may vary within the following limits:

Bilayer source (1)	01.0 - 10.0 % by wt.
Lipid (2)	05.0 - 60.0 % by wt.

Salts of organic carboxylic acid (3)	00.1 - 10.0 % by wt.
Alcohol (4)	00.1 - 20.0 % by wt.
Stabiliser (5)	00.1 - 10.0 % by wt.

Preferably, the contents of the main components of the skin treatment of the invention are as follows:

Bilayer source (1)	03.0 - 08.0 % by wt.
Lipid (2)	10.0 - 40.0 % by wt.
Salts of organic carboxylic acid (3)	00.5 - 05.0 % by wt.
Alcohol (4)	00.5 - 16.0 % by wt.
Stabiliser (5)	01.0 - 05.0 % by wt.

Accordingly, typical compositions of skin treatment agents of the invention are:

(A)

Bilayer source (1)	06.0 % by wt.
Lipid (2)	15.0 % by wt.
Salts of organic carboxylic acid (3)	01.2 % by wt.
Alcohol (4)	14.0 % by wt.
Stabiliser (5)	01.0 % by wt.
Water, fragrances, preservatives, etc.	62.8 % by wt.
Total	100.0 % by wt.

(B)

Bilayer source (1)	06.5 % by wt.
Lipid (2)	17.0 % by wt.
Salts of organic carboxylic acid (3)	02.0 % by wt.
Alcohol (4)	16.0 % by wt.
Stabiliser (5)	01.0 % by wt.
Water, fragrances, preservatives, etc.	57.5 % by wt.
Total	100.0 % by wt.

(C)

Bilayer source (1)	10.0 % by wt.
Lipid (2)	40.0 % by wt.
Salts of organic carboxylic acid (3)	02.0 % by wt.
Alcohol (4)	10.0 % by wt.
Stabiliser (5)	01.0 % by wt.
Water, fragrances, preservatives, etc.	37.0 % by wt.
Total	100.0 % by wt.

(D)

Bilayer source (1)	01.0 % by wt.
Lipid (2)	05.0 % by wt.
Salts of organic carboxylic acid (3)	00.1 % by wt.
Alcohol (4)	20.0 % by wt.
Stabiliser (5)	00.1 % by wt.
Water, fragrances, preservatives, etc.	68.9 % by wt.
Total	100.0 % by wt.

(E)

Bilayer source (1)	10.0 % by wt.
Lipid (2)	10.0 % by wt.
Salts of organic carboxylic acid (3)	00.5 % by wt.
Alcohol (4)	16.0 % by wt.
Stabiliser (5)	10.0 % by wt.
Water, fragrances, preservatives, etc.	53.5 % by wt.
Total	100.0 % by wt.

(F)

Bilayer source (1)	08.0 % by wt.
Lipid (2)	60.0 % by wt.
Salts of organic carboxylic acid (3)	10.0 % by wt.
Alcohol (4)	05.0 % by wt.
Stabiliser (5)	05.0 % by wt.
Water, fragrances, preservatives, etc.	09.0 % by wt.
Total	100.0 % by wt.

(G)

Bilayer source (1)	03.0 % by wt.
Lipid (2)	10.0 % by wt.
Salts of organic carboxylic acid (3)	00.5 % by wt.
Alcohol (4)	16.0 % by wt.
Stabiliser (5)	01.0 % by wt.
Water, fragrances, preservatives, etc.	69.5 % by wt.
Total	100.0 % by wt.

(H)

Bilayer source (1)	05.0 % by wt.
Lipid (2)	25.0 % by wt.
Salts of organic carboxylic acid (3)	01.0 % by wt.
Alcohol (4)	00.1 % by wt.
Stabiliser (5)	05.0 % by wt.
Water, fragrances, preservatives, etc.	63.9 % by wt.
Total	100.0 % by wt.

The skin treatment agents of the invention may be composed entirely of natural substances or substances identical to natural ones and derivatives thereof without any of the typical preservatives such as p-hydroxy benzoic acid ester, formaldehyde cleaving agents, isothiazolinones etc. This is shown by the following formulation:

Phosphatidyl choline (1)	06.0 % by wt.
Avocado oil (2)	15.0 % by wt.
Stearic acid-potassium salt (3)	01.2 % by wt.
Ethanol (4)	16.0 % by wt.
Urea (5)	01.0 % by wt.
Water, rose oil, vitamin E, natural thickener	60.8 % by wt.
Total	100.0 % by wt.

This has the advantage that the skin treatment agents of the invention are particularly well tolerated by the skin from a dermatological point of view and that penetration of preservatives into the skin is avoided.

Depending on the composition, the skin treatment agents of the invention have an ointment-like, creamy or milky consistency.

The preparation and composition of the skin treatment agents of the invention and their application when different components are used are shown in the following examples. The phosphatidyl choline of soy-bean origin used in the examples is concentrated to about 90 % and available commercially under the name Phospholipon 90. Similar products may be purchased under other names such as Lipoid S 100, Epikuron 200 or Sternlipid PC-90. It goes without saying that products of lower concentration may be used if they are compatible with the other components and if their composition corresponds to what is required for the skin treatment agents of the invention.

The numbers in brackets (1) to (5) following the components correspond to the classification of the main components of the skin treatment agents used in the description, namely (1) for the bilayer source, (2) for the lipid, (3) for the salts of organic carboxylic acids, (4) for the alcohol, (5) for the stabiliser. As illustrated in the description, these components, in turn, may consist of mixtures of single components.

#### Example 1

##### Skin-care cream

Phosphatidyl choline (90 %) (1)	06.0 % by wt.
Avocado oil (2)	15.0 % by wt.
Vitamin E acetate	00.2 % by wt.
Ethanol (96 %) (4)	14.0 % by wt.
are mixed. Then stearic acid potassium salt (3) is incorporated. An aqueous solution of	01.2 % by wt.
Water	61.4 % by wt.
Urea (5)	01.0 % by wt.
Panthenol	01.0 % by wt.
Fumaric acid-mono potassium salt	00.2 % by wt.
is slowly dropped into the mixture with stirring, resulting in a milky formulation.	
	100.0 % by wt.

The consistency of the formulation may be adjusted with the usual thickeners, such as xanthan gum, polyacrylate, alginate.

### Example 2

#### Skin-care milk

Phosphatidyl choline (90 %) (1)	06.5 % by wt.
Thistle oil (2)	17.0 % by wt.
Vitamin E palmitate	00.2 % by wt.
Ethanol (96 %) (4)	16.0 % by wt.
are mixed. Then palmitic acid sodium salt (3)	02.0 % by wt.
is incorporated. An aqueous solution of	
Water	56.1 % by wt.
Urea (5)	01.0 % by wt.
Panthenol	01.0 % by wt.
Fragrances	00.2 % by wt.
is slowly dropped into the mixture with	
stirring, resulting in a milky formulation.	
	100.0 % by wt.

### Example 3

#### Anti-acne milk

Phosphatidyl choline (90 %) (1)	10.0 % by wt.
Sunflower oil (2)	40.0 % by wt.
Vitamin E acetate	00.2 % by wt.
Vitamin A palmitate	01.0 % by wt.
Ethanol (96 %) (4)	10.0 % by wt.
are mixed. Then stearic acid sodium salt (3)	02.0 % by wt.
is incorporated. An aqueous solution of	
Water	34.6 % by wt.
Urea (5)	00.5 % by wt.
Sorbitol (5)	00.5 % by wt.
Citric acid mono sodium salt	00.2 % by wt.
is slowly dropped into the mixture with	
stirring, resulting in a milky formulation.	
	100.0 % by wt.

The consistency of the formulation may be adjusted with the usual viscosity regulators such as polyacrylate.

#### Example 4

##### Cleansing milk

Phosphatidyl choline (90 %) (1)	01.0 % by wt.
Jojoba oil (2)	05.0 % by wt.
Vitamin E	00.2 % by wt.
Ethanol (96 %) (4)	20.0 % by wt.
are mixed. Then stearic acid potassium salt	00.1 % by wt.
(3) is incorporated. An aqueous solution of	
Water	73.2 % by wt.
Urea (5)	00.1 % by wt.
Fragrances	00.2 % by wt.
Fumaric acid-mono potassium salt	00.2 % by wt.
is slowly dropped into the mixture with	
stirring, resulting in a milky formulation.	
	100.0 % by wt.

#### Example 5

##### Anti-psoriasis cream

Phosphatidyl choline (90 %) (1)	10.0 % by wt.
Evening primrose oil (2)	10.0 % by wt.
Vitamin E acetate	00.2 % by wt.
Ethanol (96 %) (4)	16.0 % by wt.
are mixed. Then stearic acid sodium (3) is	00.5 % by wt.
incorporated. An aqueous solution of	
Water	49.3 % by wt.
Urea (5)	10.0 % by wt.
Panthenol	01.0 % by wt.
Fumaric acid-mono potassium salt	03.0 % by wt.
is slowly dropped into the mixture with	
stirring, resulting in a milky formulation.	
	100.0 % by wt.

The formulation may be adjusted to the desired consistency, for example by adding xanthan gum.

#### Example 6

##### Dermatological night-cream

Phosphatidyl choline (90 %) (1)	08.0 % by wt.
Sunflower oil (2)	20.0 % by wt.
Wheat germ oil (2)	15.0 % by wt.
Jojoba oil (2)	10.0 % by wt.
Paraffin oil (2)	10.0 % by wt.
Squalane (2)	05.0 % by wt.
Vitamin E	00.2 % by wt.
1,2-Propylene glycol (4)	05.0 % by wt.
are mixed. Then palmitoyl collagen hydroxylate sodium salt (3) is incorporated into the mixture. An aqueous solution of	02.0 % by wt.
Water	16.1 % by wt.
Urea (5)	00.1 % by wt.
Citric acid mono potassium salt	00.2 % by wt.
Preservative	00.3 % by wt.
Perfume oil	00.1 % by wt.
is slowly dropped into the mixture with stirring, resulting in a creamy formulation.	
	100.0 % by wt.

#### Example 7

##### Anti-mycotic lotion

Phosphatidyl choline (90 %) (1)	03.0 % by wt.
Neutral oil (medium-chain triglyceride) (2)	10.0 % by wt.
Vitamin E acetate	00.2 % by wt.
Ethanol (96 %) (4)	16.0 % by wt.
are mixed. Then palmitic acid sodium salt (3) is incorporated. An aqueous solution of	00.5 % by wt.
Water	68.9 % by wt.

Urea (5)	01.0 % by wt.
Econazol	00.2 % by wt.
Citric acid-disodium salt	00.2 % by wt.
is slowly dropped into the mixture with stirring, resulting in a lotion.	
	100.0 % by wt.

#### Example 8

#### Moisturising lotion

Phosphatidyl choline (90 %) (1)	05.0 % by wt.
Thistle oil (2)	25.0 % by wt.
Vitamin C palmitate	00.2 % by wt.
1,3-Butylene glycol (4)	01.0 % by wt.
are mixed. Then palmitoyl collagen hydrolysate sodium salt (3) is incorporated.	02.0 % by wt.
An aqueous solution of	
Water	62.5 % by wt.
Inositol (5)	01.0 % by wt.
Urea (5)	03.0 % by wt.
Sodium lactate	01.0 % by wt.
Preservative	01.0 % by wt.
Citric acid-disodium salt	00.2 % by wt.
is slowly dropped into the mixture with stirring, resulting in a creamy formulation.	
	100.0 % by wt.

As described above, the preparation of the skin treatment agents of the invention illustrated in the examples 1 to 8 may be carried out in customary stirring apparatuses at room temperature or, if desired, at temperatures of up to 60°C, providing this is tolerated by the ingredients and the mixing times familiar to the person skilled in the art are observed. The following example shows this once again for a case where, instead of the salts of the organic acids, the basic acids are used which are then converted into the salts by means of a base during preparation.

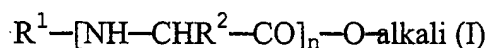
### Example 9

#### Anti-wrinkle milk

Phosphatidyl choline (90 %) (1)	06.0 % by wt.
Ceramide (from cows' brains) (1)	01.0 % by wt.
Avocado oil (2)	15.0 % by wt.
Vitamin E acetate	00.5 % by wt.
Vitamin A acid	00.2 % by wt.
Palmitic acid (3)	01.0 % by wt.
Ethanol (96 %) (4)	14.0 % by wt.
are mixed for 30 minutes by means of an anchor agitator. Then a solution of	
Water	15.0 % by wt.
Sodium hydroxide (3)	00.3 % by wt.
is slowly dropped in (15 min.). Into this mixture, another aqueous solution consisting of	
Water	44.4 % by wt.
Urea (5)	01.0 % by wt.
Panthenol	01.0 % by wt.
Citric acid-diammonium salt	00.3 % by wt.
Xanthan gum	00.3 % by wt.
is slowly dropped with stirring, resulting in a milky formulation which is homogenised over approx. 15 min.	
	100.0 % by wt.

## Claims

1. Skin treatment agents, characterised in that they contain a bilayer source, salts of organic acids, alcohol, a stabiliser and lipids.
2. Skin treatment agents according to claim 1, characterised in that the content of the bilayer source is 1 % by wt. to 10 % by wt., preferably 3 % by wt. to 8 % by weight.
3. Skin treatment agents according to claim 1 or 2, characterised in that the bilayer source consists of phospholipids or sphingolipids or a mixture of these substances.
4. Skin treatment agents according to claim 1, characterised in that the bilayer source is a liposomal system or a system comprising liposomal structures.
5. Skin treatment agents according to any of the claims 1 to 4, characterised in that the content of the salts of organic acids is 0.1 % by wt. to 10 % by wt., preferably 0.5 % by wt. to 5 % by wt.
6. Skin treatment agents according to any of the claims 1 to 5, characterised in that the salts of the organic acids are the alkali salts of the palmitic acid, stearic acid or mixtures of these acids.
7. Skin treatment agents according to any of the claims 1 to 5, characterised in that the alkali salts of acylated hydrolysates of collagen, also called collagen hydrolysate condensates, of the following formula (I) are used as the salts of the organic acids



wherein

$R^1$  is a saturated or unsaturated acyl group having 1 to 22 carbon atoms,

$R^2$  represents side chains of the amino acids of the collagen, and

$n$  is an integer from 1 to 10.

8. Skin treatment agents according to any of the claims 1 to 5, characterised in that the alkali salts of the acylated hydrolysates of elastin, casein, keratin or O-acyl derivatives of the hydroxyproline are used as the salts of organic acids.
9. Skin treatment agents according to any of the claims 1 to 8, characterised in that the alcohol content is 0.1 % by wt. to 20 % by wt., preferably 5 % by wt. to 16 % by wt.
10. Skin treatment agents according to any of the claims 1 to 9, characterised in that the alcohol is ethanol, propanol, isopropanol, 1,2-propylene glycol, 1,3-butylene glycol, glycerine or a mixture of these alcohols.
11. Skin treatment agents according to any of the claims 1 to 10, characterised in that the stabiliser content is 0.1 % by wt. to 10 % by wt., preferably 1 % by wt. to 5 % by wt.
12. Skin treatment agents according to any of the claims 1 to 11, characterised in that the stabiliser is urea or a monosaccharide, preferably glucose, fructose, mannose, galactose, sorbitol, inositol or a mixture of these substances.
13. Skin treatment agents according to any of the claims 1 to 12, characterised in that the lipid content is 5 % by wt. to 60 % by wt., preferably 10 % by wt. to 40 % by wt.
14. Skin treatment agents according to any of the claims 1 to 13, characterised in that the lipid is a fat or oil component customarily used in cosmetic and dermatological substances.